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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/618,034	07/11/2003	Kent D. Choquette	1201.67474	4147
24978	7590	07/12/2005	EXAMINER	
GREER, BURNS & CRAIN 300 S WACKER DR 25TH FLOOR CHICAGO, IL 60606			RODRIGUEZ, ARMANDO	
			ART UNIT	PAPER NUMBER
			2828	

DATE MAILED: 07/12/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/618,034

Applicant(s)

CHOQUETTE ET AL

Examiner

ARMANDO RODRIGUEZ

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-9, 12-15 and 19-21 is/are rejected.
- 7) ☒ Claim(s) 10, 11, 16-18 and 22 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 4/30/2004.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Claim Objections

Claims 5 and 6 are objected to because of the following informalities: in both claims line 1 "and " is interpreted by the examiner as a typographical error. Appropriate correction is required.

Drawings

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the plurality of defects of claims 7-10, 19, 21 and 22 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner,

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the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claims 1-4, 12, 14, 15, 20 are rejected under 35 U.S.C. 102(a) as being anticipated by Song et al (Single-fundamental-mode photonic-crystal vertical-cavity surface-emitting lasers).

Regarding claims 1, 2, 15 and 20,

Figure 1(a) illustrates a vertical cavity surface emitting laser (VCSEL) having a plurality of holes and a single defect. Pages 3901 and 3903 disclose the relationship between the etch [applicant's depth], diameter and pitch of the holes for obtaining single transverse mode. Pages 3902 and 3903 describe the ratio of the hole diameter and pitch for obtaining single transverse mode operation from the VCSEL.

Regarding claims 3 and 4,

Figure 2(a) illustrates the VCSEL as having a substrate, a bottom DBR, a top DBR, an oxide aperture [applicant's current aperture], and top and bottom electrodes.

Regarding claim 4,

Figure 4(a) illustrates the holes and the defect formed in the top DBR [applicant's finite].

Regarding claim 14,

Table 2(b) and page 3903 describe the relationship of the refractive index difference to obtain single transverse mode operation.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Song et al (Single-fundamental-mode photonic-crystal vertical-cavity surface-emitting

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lasers) as applied to claims 1 and 3 above and further in view of Gopinath (US 6,515,305).

Regarding claims 5 and 6,

Song et al is silent as to the plurality of holes extending through at least a part of the top and bottom DBR.

Gopinath illustrates in figure 1 VCSEL having a plurality of air holes or etched pillars (30) [applicant's holes], which extend through the upper mirror stack (12) [applicant's DBR] and lower mirror stack (22) [applicant's bottom DBR], see column 4 lines 1-16.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to combine the air holes or etched pillars of Gopinath with the VCSEL of Song et al because it would provide single mode operation, column 4 lines 21-24 of Gopinath.

Claims 7-9,13,19 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Song et al (Single-fundamental-mode photonic-crystal vertical-cavity surface-emitting lasers) as applied to claims 1 and 3 above and further in view of Ostergaard et al (US 6,683,898).

Regarding claims 7, 19 and 21,

Song et al is silent as to the plurality of defects.

Ostergaard et al illustrates in figure 7 a VCSEL having a plurality of apertures (118) [applicant's defects] (column 8 lines 35-37 and column 11 lines 26-35).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to combine the plurality of apertures of Ostergaard et al with the VCSEL of Song et al because provide mode control of the laser, column 11 lines 26-27 of Ostergaard et al.

Regarding claims 8 and 9,

Song et al is silent as to the plurality of defects.

In column 5 lines 3-9, discloses and implies having three or more apertures within the VCSEL.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to combine the plurality of apertures of Ostergaard et al with the VCSEL of Song et al because provide mode control of the laser, column 11 lines 26-27 of Ostergaard et al.

Regarding claim 13,

Song et al is silent as to having an electrical current aperture comprising ion implanted.

However, the use of ion implanted current aperture is well known in the art, as illustrated in figure 4 and described in column 10 lines 35-36 by Ostergaard et al.

Allowable Subject Matter

Claims 10, 11, 16-18 and 22 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ARMANDO RODRIGUEZ whose telephone number is 571-272-1952. The examiner can normally be reached on 9:00 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, MINSUN HARVEY can be reached on 571-272-1835. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


ARMANDO RODRIGUEZ
Examiner
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AR/MH